pathology, often treat urinary extravasation with insufficient boldness. I can only further emphasize the various important points in the paper. The necessity for an early accurate diagnosis is most important, since delay directly increases the mortality. Witness the figures in Table 2 where, from the third day on, the mortality ranges from 65 to 100 per cent. Even early diagnosis may still carry a 20 to 25 per cent mortality in the hands of able urological surgeons. A familiarity with the areas extravasated, as well as the pelvic fascias controlling the spread of such extravasations, will aid the surgeon in localizing the site of rupture. The extravasation, and not its underlying causes (such as urethral stricture, etc.), must then be treated at the moment. The draining of the bladder by cystotomy, and multiple wide incisions of all extravasated or suspiciously extravasated areas is paramount. The latter is most important, for it is here that the surgeon with insufficient experience is apt to be too conservative. If you have a patient with a wide extravasation, be bold and drain most extensively every part of even suspicious appearing areas. I have always made it a point that when I thought that the case had been sufficiently incised, to continue a bit more. It is better to overdrain (if such is possible in some of these cases) than to see your patient die of a progressive toxemia, or to later remove additional areas of necrotic tissue. Of course, cases of localized extravasation, occurring between the layers of the pelvic fascia and confining itself to the scrotum, need only have scrotal drainage; but all others must necessarily be more extensive if you would save your patient. Urinary extravasation cannot and must never be treated conservatively. As Doctor Negley has shown in Table 4, all such patients will die if not drained surgically.

Many of these patients, extravasated over a period of several days, will be brought in moribund and nothing can save them; others treated in a bold manner will make a dramatic recovery, and later advance to a point where the underlying cause of the extravasation may be corrected.

In conclusion, let me stress: (1) early correct diagnosis, (2) extensive and thorough incisional drainage of extravasated areas in conjunction with cystotomy, and (3) correction of the underlying cause of the extravasation in the latter or convalescent stages of your patient.

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H. C. BUMPUS, JR., M. D. (112 North Madison Avenue, Pasadena).—Intelligent treatment of urinary extravasation, following urethral stricture, demands a familiarity by the operator with the fascial planes of the perineum and genitals; for, as the authors have stated, these planes control the advancement of urine escaping from the urethra.

Interesting enough, the principal fascias involved still carry the names of their first describers. Buch's fascia is named for Gordon Buch of the New York Hospital who, in 1848, described the extension of the suspensory ligament of the penis which encloses the penile structures after it fuses with the triangular ligament, and so determines the course of urine escaping from the anterior urethra. Some thirty-seven years prior to Buch's observations, an Irish surgeon, Abraham Colles, had observed that rupture of the posterior urethra was followed by perineal swelling that spread to the scrotum and later to the pubis, while rupture of the deep urethra resulted in abscess formation that pointed in the ischiorectal fossa. He then described what has since been known as Colles's fascia, which, by its density and attachments, definitely limits the extravasation of urine.

The essayists rightly emphasize the importance of early and extensive interference if success is to be expected, and I can but stress the point that, in cases such as they describe, a period of observation has no place. I think it should also be emphasized that stricture in itself is seldom the cause of urinary extravasation. It must be complicated, as in the typical case they refer to, by trauma or infection before extravasation will occur. In fact, it seems very doubtful if true extravasation of urine ever occurs except following trauma. The so-called urinary extravasation associated with stricture is much better termed peri-urethral gangrene, and by thus emphasizing its infectious etiology the hazards incident to neglect of strictures of the urethra are made more apparent.

SARCOID*

By FREDERICK G. NOVY, JR., M.D.
Oakland

DISCUSSION *by Kendal Frost, M. D., Los Angeles; Nelson S. Keeler, M. D., Oakland; Stuart C. Way, M. D., San Francisco.*

THE recent observation of a patient with sarcoid having an unusual nasal involvement has prompted this short review of the subject and the report of the case. Sarcoids are best considered along with other unusual forms of tuberculosis. While there is by no means complete accord among dermatologists as to the classification of cutaneous tuberculosis, there are in the main three groups:

RELATION OF SARCOID TO OTHER FORMS OF TUBERCULOSIS

1. *True Tuberculosis of the Skin.*—In this group there are two subdivisions: The first is the exogenous type, a direct implantation of the tubercle bacillus into the skin, as exemplified by the anatomical tubercle or tuberculosis verrucosa cutis. The second is the endogenous type, in which the infection is carried to the skin by the blood stream, or direct extension from some deeper tuberculous process, as bone, lymph gland, or excretions from the lungs or gastro-intestinal tract. Examples of this group are: lupus vulgaris, scrofuloderma, and tuberculosis cutis orificialis.

2. *Tuberculids.*—These, because of the association with tuberculosis elsewhere in the body, and their histology, are considered to be due to toxic products of the infection. The most important in this group are lichen scrofulosorum, papulonecrotic tuberculids, and erythema induratum of Bazin.

3. *Sarcoids.*—This includes multiple benign sarcoid (lupoid) of Boeck, sarcoid of Darier-Roussy, lupus pernio, and others which questionably belong here.

RECENT LITERATURE ON SARCOIDS

In recent years the subject of sarcoids has been extensively reviewed by many authors, and the interested reader is referred to such excellent articles as those of Goeckerman,[1] Sulzberger,[2] Nomland,[3] and the recent symposium in France on sarcoids.[4]

DARIER'S FOUR GROUP CLASSIFICATION

Since the first description of this group by Boeck,[5] other conditions have been included. Some of these have stood the test of time, while others have been added only to be again placed elsewhere. The Darier classification, which included four types, has been standard for a long time, and is still used in some texts. These four types were: (1) Multiple benign sarcoid (Boeck); (2) subcutaneous sarcoid (Darier-Roussy); (3) sarcoid nodularis of the extremities; and (4) sarcoid of Spiegler-Fendt.

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Read before the Dermatology and Syphilology Section of the California Medical Association at the sixty-fourth annual session, Yosemite National Park, May 13-16, 1935.

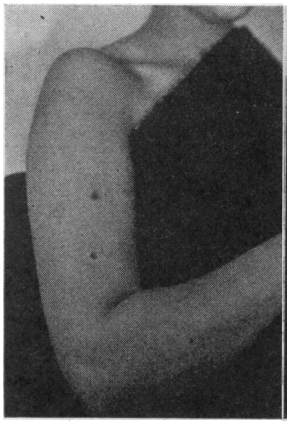

Fig. 1

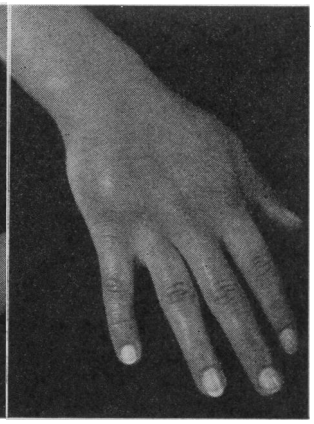

Fig. 2

Fig. 1.—Superficial sarcoids on the right arm.
Fig. 2.—Sarcoid tumor between the fourth and fifth metacarpals of the right hand.

In a recent communication, Darier[6] no longer includes these last two types. Sarcoid nodularis of the extremities is now thought to be only a form of erythema induratum of Bazin, and so should be placed with it in the group of tuberculids.

OTHER TYPES

Sarcoid of Spiegler-Fendt is a rare neoplastic condition of low malignancy belonging to the group of lymphoblastomas, as has been shown by Sweitzer[7] and Lewis.[8] Clinically, however, there is a close resemblance. The term sarcoid for this condition, because of the confusion, should be discarded, and its other term, sarcomatosis cutis, should be employed.

The difference between the first two types—that of Boeck, and the subcutaneous variety of Darier-Roussy—is really only one of depth of the involvement of the skin. In the latter type, the nodules occur only in the corium or subcutis. Cases showing both types are frequently met with.

Lupus pernio, a condition involving the exposed parts, as the fingers, ears, nose, and feet, with deep colored infiltrations and nodules, should be included, from its clinical and histological picture, in the group of sarcoids. This was the recent general consensus of opinion of European observers.

Nodular tuberculosis of the hypoderm of Wende is another condition, as suggested by Goeckerman,[1] which should not be a separate clinical entity, as it also has the characteristics of sarcoids.

SARCOIDS MAY BE DESCRIBED UNDER ONE HEADING

In brief, then, we may describe sarcoids under one heading. The eruption is made up of scattered papules, nodules, and occasionally plaques involving, for the most part, the face and extremities. These are firm and painless, and when involving the epidermis have a purplish-red color. On diascopic pressure many of the papules have a yellow hue, the so-called, "apple-jelly nodule." The deeper lesions have a tendency to follow the lymphatics and blood vessels. They do not ulcerate or break down. This is an important feature in that other forms of tuberculosis have a tendency to do so. The eruption may appear suddenly, hundreds of lesions appearing in a short period of time, or there may be a gradual evolution, a few nodules developing at a time over a course of years. On healing, either spontaneously or under treatment, there is some atrophic scarring.

Sarcoid is not merely a cutaneous disease, but similar nodules and tumors have been found in nearly every organ in the body. This fact is being recognized more and more, so that now nearly every case reported shows that more than one tissue has become involved. The most frequent of these are the lungs, bones, and mucous membranes.

In the lungs there are rather definite discrete nodules, which usually involve the middle or lower lobes and are around the large bronchi. The x-ray findings are confusing with tuberculosis. The physical findings in the lungs are ordinarily negative. In large series of cases reported recently, as for example, those of Frost,[9] Goeckerman,[1] and Nomland,[3], the percentage of positive lung findings is fairly high.

In the bones, which are also a site of frequent involvement, there are found rather marked changes. In many there is actual punched-out bony destruction and cystic changes. This is seen most frequently in the bones of the hands and feet. Doub and Menagh[10] have reviewed this phase of the subject from the roentgenological viewpoint. This condition has been called osteitis tuberculosa multiplex cystica.

Involvement of the mucous surfaces, such as the eye, tonsils, and larynx have been reported. The nasal mucosa, however, is the most common site. Allison and Mikell[11] reported a case in which there were marked destruction and perforation of the septum, and a tumor mass involving the entire epiglottis. Lomholt[12] states that nearly 60 per cent of the cases seen in Denmark show mucous membrane lesions. He describes three stages in the evolution of the process in the nose. First, there are discrete grayish nodules with an erythematous halo, situated usually on the inferior turbinate. This is similar to the condition seen in the case to be reported, and has not been particularly noted in cases described in this country. The second stage is that of a catarrhal condition with heavy crusts and erosions. The final stage is secondary obstructive hypertrophy of the turbinates and fibrosis.

Enlargement of groups of lymph nodes, particularly those draining areas in which there are cutaneous manifestations, has been noted. Of the internal organs in which sarcoids have been found are the pericardium, kidneys, spleen, liver, and central nervous system.[13]

REACTION TO THE TUBERCULIN TEST

Another finding of interest in these cases is that nearly all of them have a negative tuberculin test. Sulzberger[2] believes this to be due to a condition of anergy in the patient, and is a differential point between this condition and tuberculids which are hyperergic to tuberculin. Martenstein and Jadassohn[14] have shown that serum of

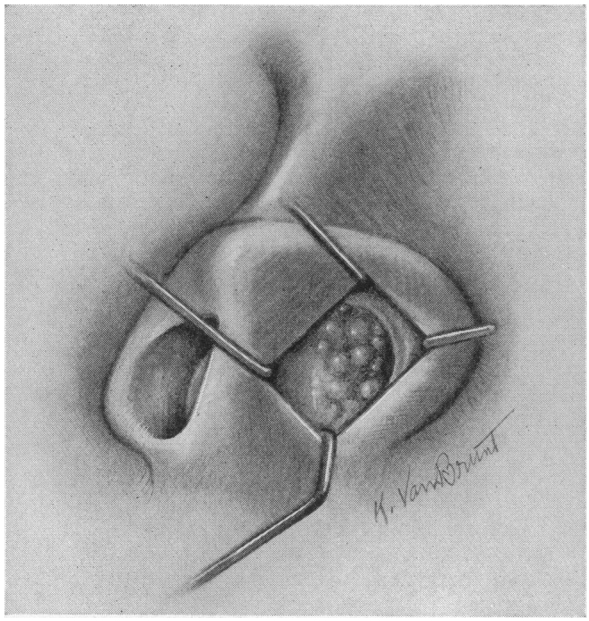

Fig. 3.—Early sarcoid involvement of the nose.

patients with sarcoid, mixed with tuberculin in vitro, gives a negative reaction in susceptible persons. In other words, the serum contains the so-called anticutins which will neutralize the tuberculin, and does not rule out tuberculosis as the etiologic factor.

MICROSCOPIC PATHOLOGY

The microscopic pathology in well developed nodules of sarcoid is characteristic. In early lesions this is not true, in that there is a nonspecific cellular infiltration, mostly of lymphocytes and a few epithelioid cells, about dilated blood vessels. In the well-developed nodule one sees sharply circumscribed tubercles, which are separated from one another by definite connective tissue septa. The tubercles themselves are composed nearly entirely of epithelioid cells, with a slight infiltrate of lymphocytes at the periphery of the nodule. They seem to arise from perivascular tissue. Giant cells are occasionally seen. There is never any evidence of necrosis or caseation, which is a differential point between this and true tuberculosis. In the skin these nodules can be seen in any part of the corium, usually in the deeper portions. Changes in the epidermis are secondary.

ETIOLOGY

The etiology of sarcoid is by no means settled, but today it is thought by most authors to be tuberculous in nature, due to an attenuated or bovine strain of the bacillus. This is substantiated by the many observations of tuberculosis elsewhere in the body at autopsy. Klauder[15] reported such a case. It has been difficult to demonstrate the organism in material from the nodules, and usually animal inoculations have been negative. However, in very early lesions, the bacilli have been found, as in the classical case of Kyrle and that of Wende,[16] if we accept his case as one of sarcoid. In a few instances, inoculated animals, in this very early period, have also been positive for tuberculosis.

There are, however, many who think that the sarcoid reaction is not typical for any specific disease, but can be caused by several other different infections, as syphilis, leprosy, and even foreign bodies if the tissue reaction of the individual is such as to produce this type of response. Darier[6] recently felt this way as to the etiology.

A third group feel that sarcoid is a disease by itself, as it is a generalized reaction involving not only the skin, but usually other organs at the same time. The negative tuberculin reaction is to them against a tuberculous etiology, as well as the nearly negative results of finding the bacillus of tuberculosis, either directly or by animal inoculation. Another point brought out is the peculiar bone and lung findings. These, however, could well be on a tubercular basis.

At present, the bulk of positive evidence is that sarcoids are a manifestation of tuberculosis.

REPORT OF CASE

Case 1.—W. M., a colored school girl, age seventeen, was first seen at the Oakland Health Center, May 22, 1934, complaining of frequent nosebleeds and an eruption on the arm of several months' duration.

In December, 1933, the patient had a "bad cold," and at this time she had an infected finger which took some time to heal. The cold persisted, and with it she began to have nosebleeds and some discharge which formed heavy crusts. These symptoms became more and more noticeable, so that obstruction of the nose developed at times and she would have trouble breathing. This continued until the time of her first visit.

In February, 1934, she had an infected area on the right leg which cleared up in about three weeks, with a slight scar. About the same time two small nodules appeared, one on the right arm, and the other on the chin. For some time these gradually grew larger, and then remained stationary. There was no pain associated with their development, but they were somewhat tender to touch. After some weeks of evolution the involved skin took on a purplish color, and later there was some slight scaling. This was in March, 1934. Since that time there has been no change in their appearance. Other new lesions have developed recently. Several on the back of a similar nature, and others which she could feel, but which showed no change in the overlying skin.

In May, 1934, a painless swelling developed in the right hand which gradually increased in size. At first there was no interference in motion, but of late there has been some.

Along with the above conditions she has had some general malaise. From April to July there has been a loss of ten pounds in weight. Recently there have been frontal headaches, which have increased in frequency and severity. After eating she has felt distended, and occasionally there has been vomiting.

The past and family history were negative. There have been no known contacts with tuberculosis.

Examination.—The patient was first seen in the otology service, and at this time she presented hypertrophy of the septum and turbinates, with a purulent discharge. This condition did not change.

On July 13, 1934, she was seen in the dermatologic clinic and presented about twenty scattered nodules over the face, extremities, and trunk. These varied in size from about one centimeter to three centimeters in diameter. They were all firm and nonlobulated, and not tender to palpation. Most of them did not involve the epidermis, nor did they appear to be attached to it. On the outer aspect of the left arm were two

tumors, one above the other, which had the same consistency, but they definitely involved the overlying epidermis. The skin had a deep purplish hue and in the center part of these there was some crusting which, on removal, showed a serous discharge, but no ulceration. On diascopic pressure there was a suggestion of a yellowish nodule, but this was not definite. The chin and back presented similar lesions. All of the others, as stated above, were subcutaneous.

The right hand presented a tumor mass between the fourth and fifth metacarpals. This was irregular, slightly movable, and of a nearly bony consistency, and appeared to be attached to the bone. Biopsy from this mass was taken several months later by Dr. L. Barnard, who found the tumor to be attached to the tendon, and not to involve the bone.

The mucous membrane of the nose presented marked crusting which, on removal, showed considerable erythema. Scattered over the septum, lateral wall, and floor of the nose, there were numerous pearly discrete tumors resembling small buds of granulation tissue. They were about the size of a glass-headed pin. The rest of the pharyngeal mucous membrane was normal. Bronchoscopic examination showed no evidence of lesions in the bronchial tree. Two of these tumors were removed by Doctor Keeler, one for histologic study, and the other for guinea-pig inoculation. General examination did not reveal any other pathology.

The routine laboratory tests of the urine and blood were negative, except that there was a slight secondary anemia. The sputum did not show any acid-fast organisms. The culture from the nose did not have any unusual organisms.

The guinea-pig, inoculated with one of the tumors from the nose, was killed and autopsied at the end of two months. No evidence of tuberculosis was found. This finding is frequently met with in cases of sarcoid. Only very early lesions have showed positive inoculations.

Intracutaneous injections of old tuberculin were negative with 0.1 milligram and 1.0 milligram.

X-ray findings of the hands and feet did not show changes so commonly seen in this condition. This was a little surprising, in that the patient had this hard swelling in the right hand. An x-ray of the lungs showed only slight bronchial thickening, and none of the nodules which have been noted in some of these cases.

Biopsies. — A biopsy was taken from one of the papules on the arm and examined in the dermatology department of the University of California. The epidermis showed elongation of the rete pegs, and in the basal layers there was some intercellular edema. The granular layer and outer layers were normal. Throughout the corium there was some edema. This was particularly noted in the papillary bodies. There was a slight cellular infiltration, which was made up mostly of lymphocytes which tended to be perivascular. Deep in the corium there were several well-formed tubercles. The largest of these extended down nearly to the fatty layer. They were made up of a dense collection of epithelioid cells and fibroblasts. At the periphery of the tubercle there were a few lymphocytes. No giant cells were noticed. There was no evidence of central necrosis.

In the upper corium, divided by connective tissue septa, were several small early tubercles similar to the larger deeper ones. The cytoplasm of some of the epithelioid cells was stained poorly, and there was a tendency for vascuolization.

The biopsy from the nose had a transitional type of epithelium, but a few goblet-cells were seen. Throughout the section there were several large granulomas which were discrete, and extended as deep as the section of the skin. At the margin the fibroblasts were greater in number and seemed to form nearly a limiting membrane. No giant cells and no necrosis were noticed. A number of the tubercles were rather vascular, and large blood vessels could be noted in the central part. There was an infiltrate of lymphocytes which was confined almost entirely to the periphery, but when blood vessels were present they would tend to follow them into the central part of the tubercle. In the dense tubercles this vascularization was not noted. Throughout the section there was some lymphocytic infiltration about the mucous glands.

The section taken from the tumor of the hand presented the same pathology as the other two biopsies. There was no evidence of bony involvement.

The histopathologic diagnosis was that of sarcoid.

The patient has recently completed a course of six injections of neoarsphenamin with no change in the lesions except the tumor on the hand, which has become larger.

COMMENT

The laboratory findings in the case herein reported are similar to those found in most cases of sarcoid, namely, a negative reaction to tuberculin and no evidence of tuberculosis in a guinea-pig inoculated with one of the tumors.

The lungs and bones, frequent sites of infection, were free of evidence of the disease. This is somewhat surprising in the case of the bones of the right hand, as the tendon sheath between the fourth and fifth metacarpals was markedly involved.

The unusual features of this case were that the patient presented nodules of the skin, both of the superficial and deep types, and similar lesions in the nose. While nasal involvement is by no means rare, the type seen in this case, of small discrete pearly nodules, is apparently unusual in this country.

411 Thirtieth Street.

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DISCUSSION

KENDAL FROST, M. D. (1930 Wilshire Boulevard, Los Angeles).—The group of conditions to which we give the name of sarcoid has interested me for a number of years. Doctor Novy's presentation of the tuberculous aspect of the condition is so adequate that it needs no further elucidation. There is a school in Denmark, particularly, which believes that sarcoid (both Boeck and Darier-Roussy types) is due to a bacillus closely allied to the tubercle bacillus, and also resembling in some ways the bacillus of leprosy. Kissmeyer has written an excellent monograph on the subject of sarcoids in which this idea is developed. He draws a distinct line between the tuberculids, including lupus pernio and the sarcoids which, according to their thesis, are a separate entity produced by a specific microörganism, responsible for the skin lesions as well as the bone and pulmonary and other visceral findings. Denmark is one of the localities in which there is relatively high incidence of the disease. In North America the disease is among the rarities. It seems reasonable to not entirely disregard this opinion coming from a locality in which a rich material is available.

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NELSON S. KEELER, M. D. (411 Thirtieth Street, Oakland).—From the standpoint of the rhinologist, sarcoid changes in the nasal mucosa appear to be an extremely rare finding. This is the first case which has come under my observation, and numerous inquiries among others in the same field have failed to reveal any other experience with it.

The most striking characteristic of the lesions in this case has been their tendency to persist without any change. Examination of the nose now presents the same picture as the original drawing, made eight months ago, the tumors retaining their discrete, pearly appearance, and remaining the same size.

A differential diagnosis should include tuberculosis, glanders, leprosy, and syphilis. The former three may be seen in their earlier stages as granulation nodules, in which, of course, may be found the causative bacteria.

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STUART C. WAY, M. D. (490 Post Street, San Francisco).—Doctor Novy, in a commendable manner, has briefly summarized our present knowledge on the subject of sarcoid. This disease, common on the European continent, is somewhat of a rarity in California.

With due respect to the recent and accepted changes made in its classification, differences of opinion persist because of the disputed etiology.

While many observers are in accord that sarcoid is a tuberculous manifestation, it seems reasonable to assume that its pathology, as is the case in other diseases, is capable of being produced by more than one bacterial toxin.

Sutton's statement that arsenic appears to be a specific in the Boeck and Spiegler-Fendt type of sarcoid speaks in behalf of its nontuberculous nature.

Although the Spiegler-Fendt type is no longer classified among the sarcoids, it is probable, as Fox and Wile have indicated, that many cases of sarcoma of the skin supposed to have been cured by arsenic really belong to the sarcoid group.

E. Hoffmann, in 1925, discussed an unusual case resembling lupus pernio, and the x-ray plates shown clearly demonstrated the presence of cystic degenerative changes in the long bones of the hand. Since that date, numerous cases of lupus and sarcoid have been personally examined for osteitis tuberculosa multiplex cystica, with negative findings. Therefore, the conclusions reached were that it is a rare complication, and not common, as Doctor Novy believes.

THE LIVER AND CARBOHYDRATE METABOLISM*

By DOUGLAS R. DRURY, M.D.
Los Angeles

DISCUSSION *by Alvin G. Foord, M. D., Pasadena; Fred H. Kruse, M. D., San Francisco.*

IN the limited space of a short article, one can treat adequately only one or two sections of the large field embraced by this subject. The liver is the real center of carbohydrate metabolism, by virtue of its control of the blood sugar level. This "duty" alone embraces many important processes. We must consider, besides, the bearing of these processes on the other activities of the liver, and it is with some of these relationships that I shall deal here; in other words, how is the liver affected by its activities in carbohydrate metabolism?

SUGAR AND FAT METABOLISMS OF THE LIVER

The relationship of the sugar and fat metabolisms of the liver is an interesting one. When the liver is storing glycogen, the fat content diminishes, as a rule, and vice versa. This reciprocal activity has been called the fat-glycogen antagonism of the liver. There are many circumstances under which fat will accumulate in this organ.

During fasting the liver becomes fatty, and this is very readily counteracted by sugar administration. In diabetes the liver fat tends to increase and this is prevented by increasing carbohydrate metabolism, often, of course, with the aid of insulin. When fat alone is fed to an animal the liver lipoid increases; but if carbohydrates are ingested at the same time the liver does not retain the fat which must be deposited elsewhere. Table 1, taken from the work of Rosenfeld, clearly illustrates this. It shows the results of feeding sesame oil to two groups of dogs. The first group received 30 grams of oil per kilo for four days; the second group received, besides the same dose of oil, 8 grams sugar per kilo.

TABLE 1.—*Showing Results of Feeding Sesame Oil to Two Groups of Dogs*

Dog Group	Liver Fat in Per Cent	Average
No. 1	27.1, 36.2, 26.8, 24.7	28.7
No. 2	15.5, 13.9, 6.8, 12.9	12.3

It is quite apparent that the added sugar prevents the deposition of fat in the second group of animals.

This antagonism can be demonstrated in still another way. If the amount of liver tissue in an animal be greatly reduced by excision of a large part of the organ, the remaining fragment will become markedly infiltrated with fat. Two-thirds of the liver of the white rat can be removed, with recovery of the animal. If an ordinary diet of

* Read before the General Medicine, General Surgery, Pathology and Bacteriology, and Obstetrics and Gynecology sections of the California Medical Association at the sixty-fourth annual session, Yosemite National Park, May 13–16, 1935.